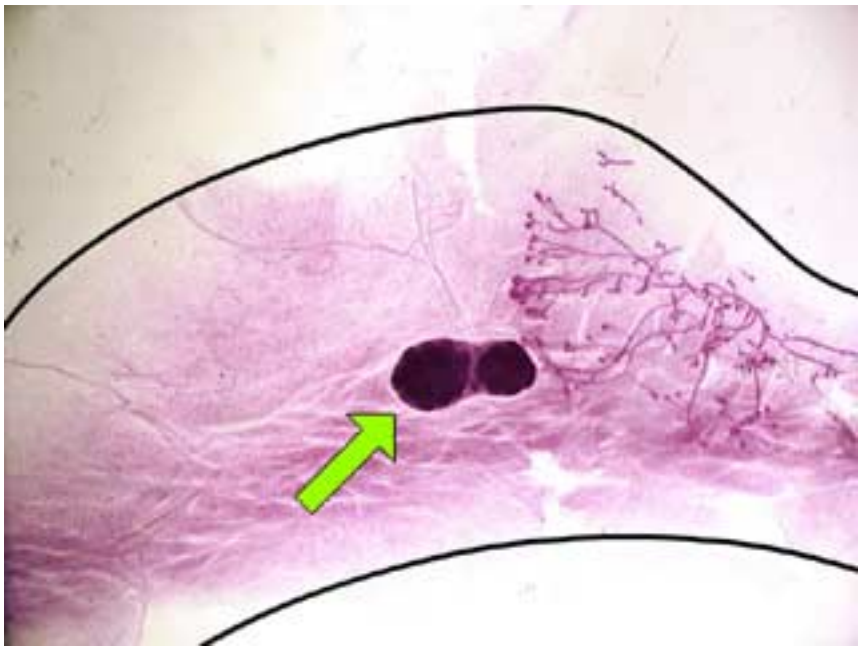
A Guide to the Analysis of the Mammary Gland

Mammary Gland Whole Mounts

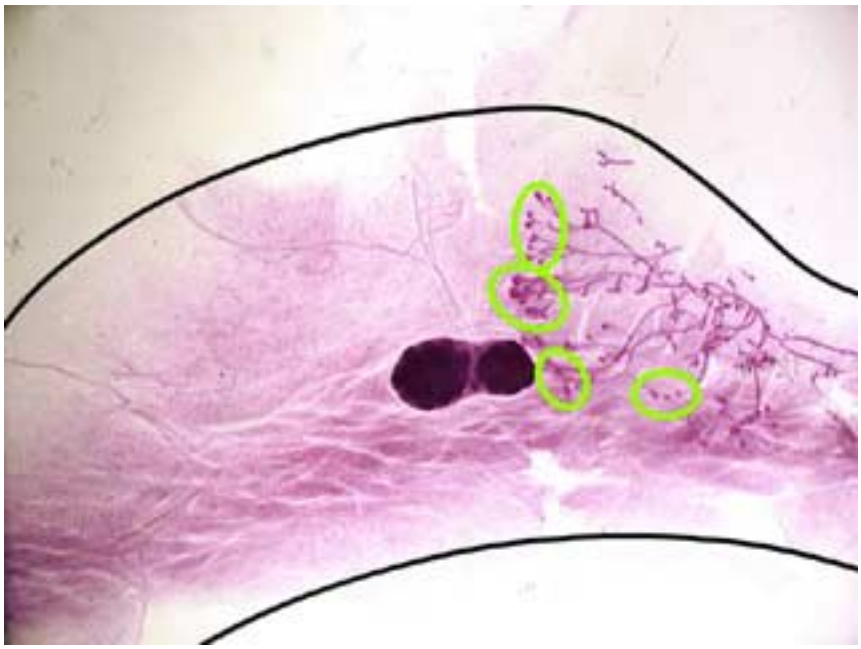
Histology Slides Script

Slide 1 - 7 week old virgin:



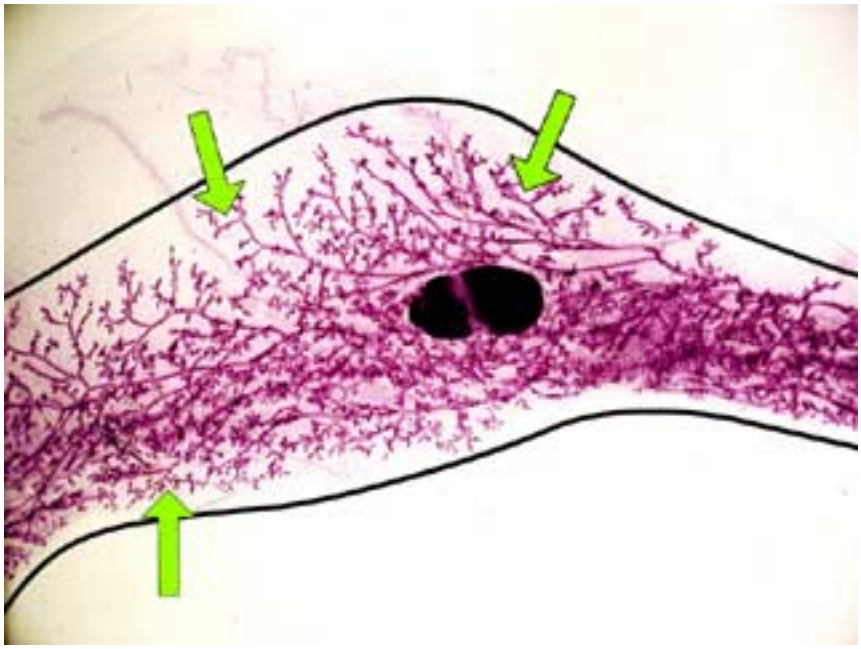
This is a mammary gland from an immature virgin mouse.

Less than half of the fat pad is filled with mammary ducts. In this sample the ducts or mammary epithelium has just reached the Lymph node.



At the end of the mammary ducts you can see normal club shaped terminal end buds. Cells within the terminal end buds undergo rapid proliferation to form the ducts. Terminal end buds disappear after the growth is complete.

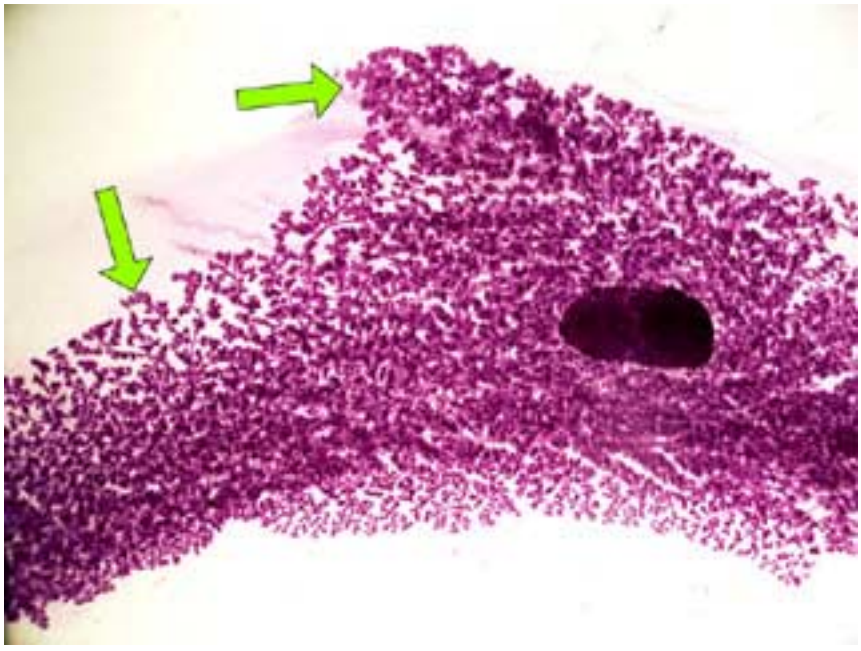
Slide 2 - Early pregnancy:



This is a mammary gland from a mouse in early pregnancy. The fat pad is now completely filled by the ductal tree. Extensive ductal branching is apparent.

Some alveoli are visible and as development proceeds these become more abundant.

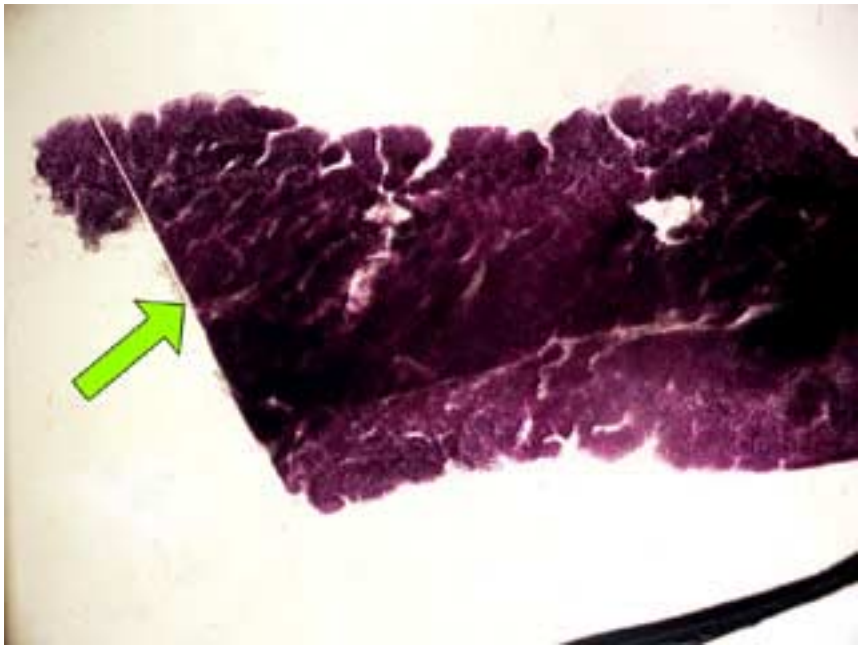
Slide 3 - Late pregnancy:



This is a mammary gland taken from a pregnant mouse one day before delivery.

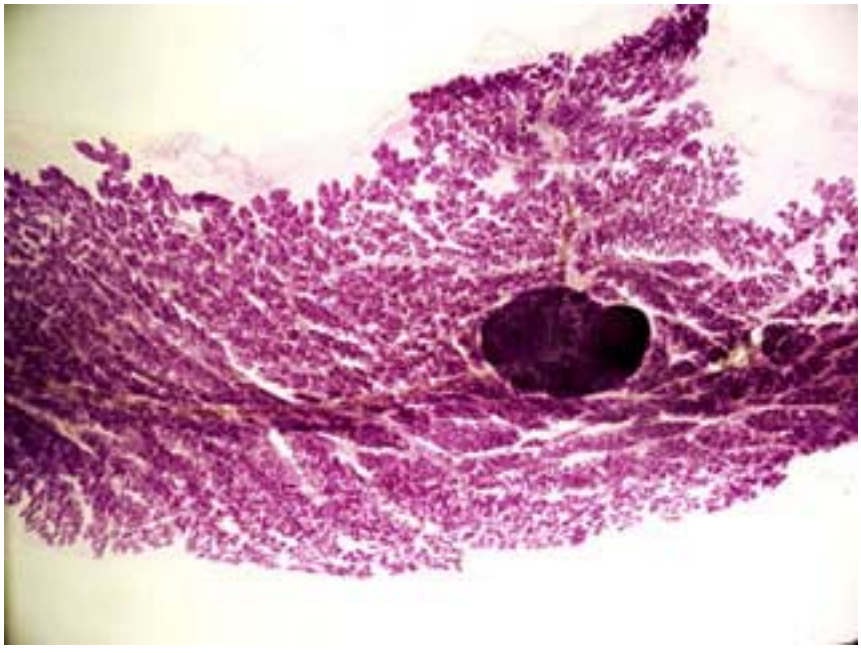
The fat pad is densely filled with alveoli, which are beginning to fill with milk.

Slide 4 - Lactating gland:



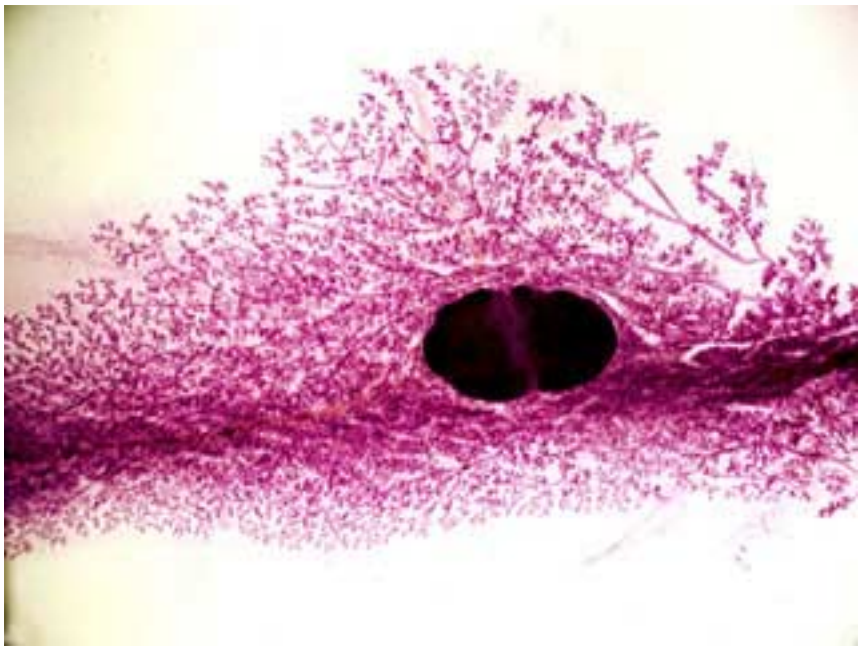
This mammary gland was taken from a mouse in which lactation is well established. As you can see it is difficult to analyze alveolar structures because of the density of the tissue. One half of the gland has been cut off and processed for histological sections. Thin sections are a more appropriate way to study alveoli within tissue from lactating mice.

Slide 5 – Involution Day 2:



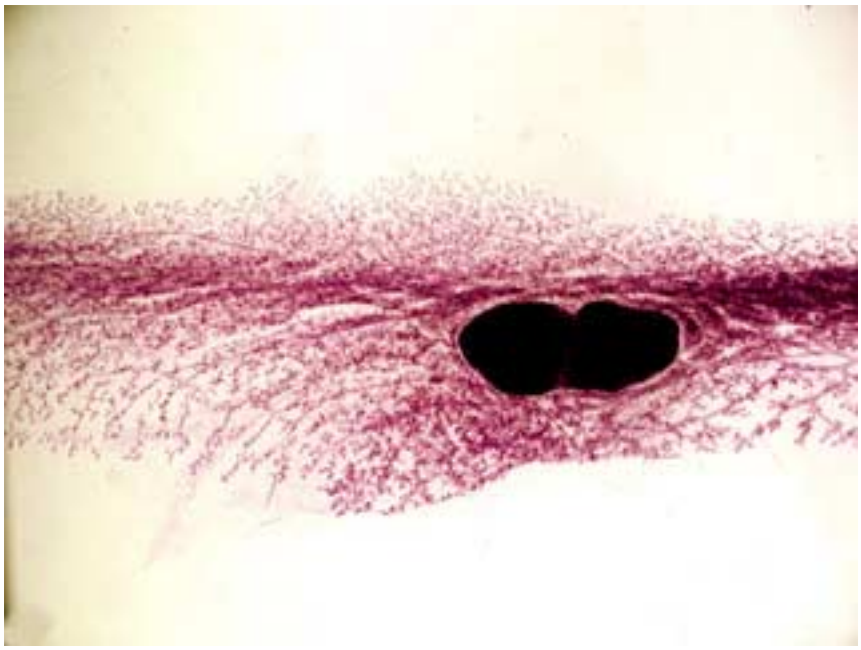
This mammary gland was taken 2 days after the pups have been removed from a dam at 10 days of lactation. It is clear that the process of involution has just begun. The overall structure of the gland is unchanged. On thin section one can see an engorgement of the alveoli, and some cells undergoing apoptosis.

Slide 6 - Involution Day 7:



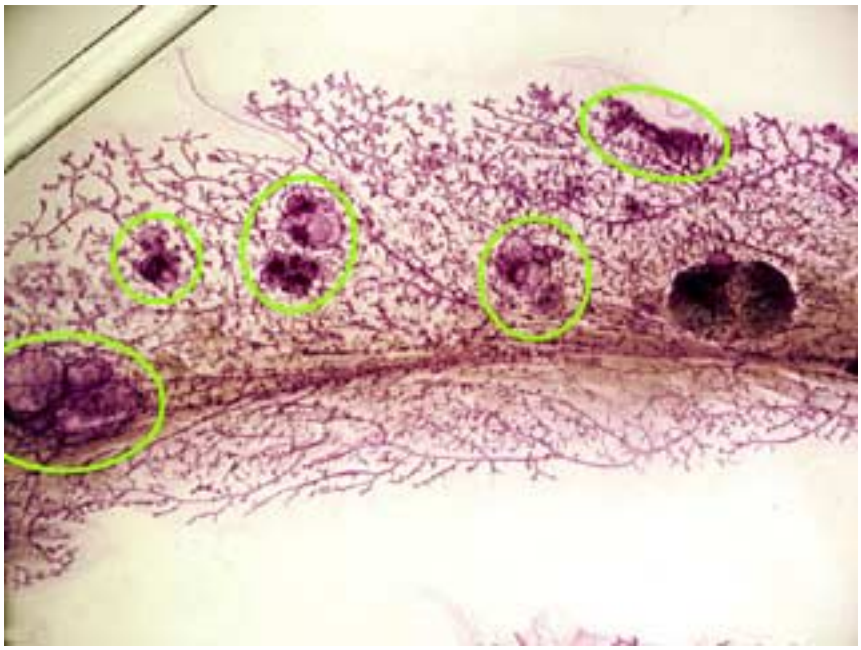
This mammary gland was taken 7 days after the pups have been removed from a dam at 10 days of lactation. The gland is being remodeled. There are fewer alveoli because of apoptosis.

Slide 7 - Involution day 10:



This mammary gland was taken on day 10 of involution. The remodeled gland resembles that of a mature virgin. The alveoli have undergone apoptosis and the tissue has been remodeled.

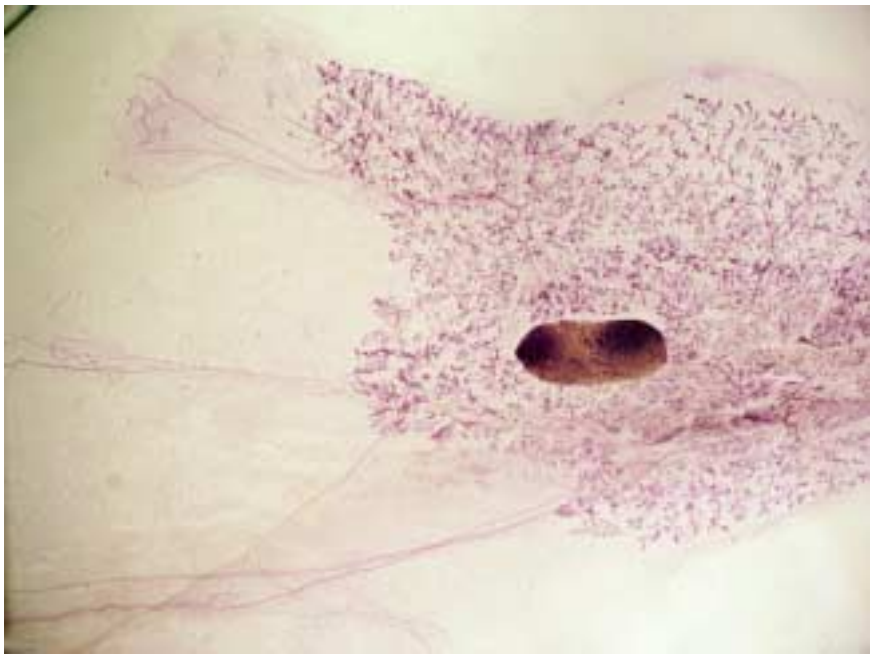
Slide 8 – Hyperplasias:



This mammary gland is from a transgenic mouse that frequently develops mammary tumors. These transgenic mice express the int3 oncogene under control of a mammary-specific promoter that is activated during each pregnancy.

The whole mount allows the visualization of hyperplasias before tumors become palpable.

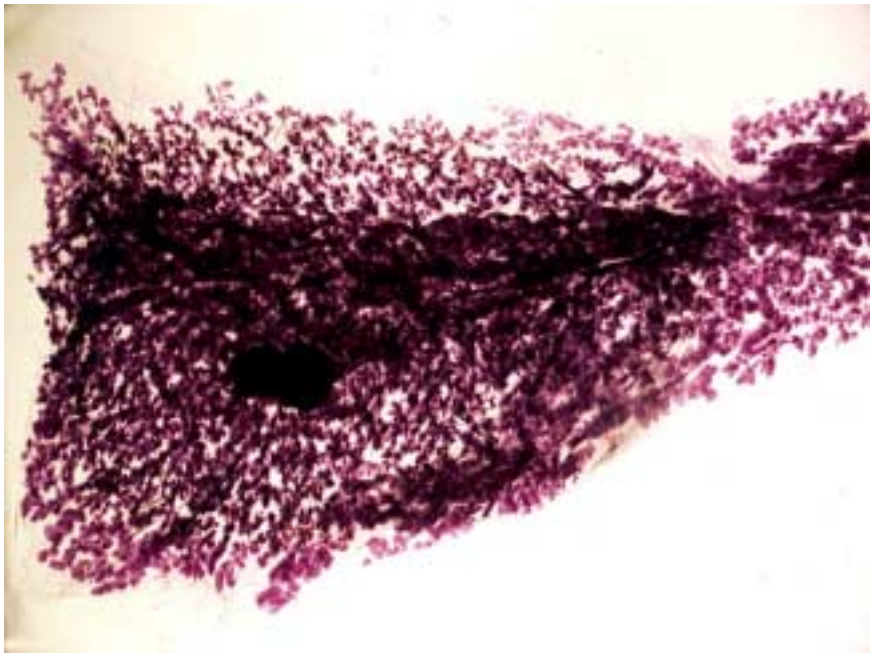
Slide 9 - Inhibin ßB



This mammary gland is from a mouse in which the inhibin ßB gene has been inactivated using gene targeting. The gland was isolated after the completion of the second lactation.

Ductal outgrowth is greatly retarded.

Slide 10 - Stat 5a



This image represents a whole mount of a mammary gland from a STAT 5a deficient mouse after parturition. Stat5a is a transcription factor that induces prolactin mediated mammary alveolar development during pregnancy.

In the absence of Stat5a, alveoli remain small and never fully differentiate.

Slide 11- Stat 5a, 5b

This image represents a mammary gland from which both Stat5a and Stat5b are absent. Stat5a and Stat5b are closely related transcription factors that mediate prolactin signaling during mammary gland development.

Mice from which the Stat5a and Stat5b genes have been deleted are infertile, and mammary development during pregnancy can therefore not be studied. These glands were derived from mammary epithelium deficient for Stat5a and Stat5b that had been transplanted in control mice, which subsequently went through one pregnancy.

Alveolar development is abrogated.